

Claims

- [c1] 1. An inductor formed on an integrated circuit chip, the inductor comprising:
two or more outer layers;
one or more inner layers between said two or more outer layers;
inductor metal winding turns included in said one or more inner layers;
and
a photoresist paste having magnetic particles, said photoresist paste at least partially forming said two or more outer layers and said one or more inner layers.
- [c2] 2. An inductor according to claim 1, wherein said photoresist paste substantially surrounds said inductor metal winding turns.
- [c3] 3. An inductor according to claim 1, wherein said magnetic particles are substantially metal-based.
- [c4] 4. An inductor according to claim 1, wherein said magnetic particles are substantially iron oxide-based.
- [c5] 5. An inductor according to claim 1, further comprising gaps between each of said two or more outer layers and said one or more inner layers.
- [c6] 6. An inductor formed on an integrated circuit chip, the inductor comprising:
two or more outer layers each including a first portion and a second portion;
one or more inner layers between said two or more outer layers;

inductor metal winding turns included in said one or more inner layers;
and

a series of magnetic metallic strips disposed on each of said first and second portions of said two or more outer layers and on each of said one or more inner layers, said series of magnetic metallic strips on said first portion and said second portion arranged so as to form a particular pattern.

[c7] 7. An inductor according to claim 6, wherein said particular pattern is a perfect orthogonal grid pattern.

[c8] 8. An inductor according to claim 6, wherein said particular pattern is a transverse grid pattern.

[c9] 9. An inductor according to claim 6, wherein said series of magnetic metallic strips substantially surrounds said inductor metal winding turns.

[c10] 10. An inductor according to claim 6, further comprising gaps between each of said two or more outer layers and said one or more inner layers.

[c11] 11. A method of forming an inductor having a magnetic core comprising the steps of:

providing one or more chambers, each having one or more metals disposed therein;

heating said one or more metals so as to generate vapors of said one or more metals;

forming a magnetic material from said vapors of said one or more metals;

providing an integrated circuit chip having at least one silicon oxide layer, said at least one silicon oxide layer having an etched opening; and depositing said magnetic material in said etched opening of said at least one silicon oxide layer.

[c12] 12. A method according to claim 11, wherein at least one of said one or more metals is iron and at least one of said one or more metals is nickel.

[c13] 13. A method according to claim 11, wherein said magnetic material is iron oxide-based.

[c14] 14. A method according to claim 11, wherein each of said chambers has a chamber wall with an adjustable aperture and said chambers are located in an oxygen environment, said oxygen environment having an oxygen density and a temperature.

[c15] 15. A method according to claim 14, wherein said forming step is controlled by controlling said oxygen density, said temperature, and said adjustable apertures.

[c16] 16. An inductor formed on an integrated circuit chip, the inductor comprising:
two or more outer layers;
one or more inner layers between said two or more outer layers;
inductor metal winding turns and a control winding in said one or more inner layers; and
at least one of a soft magnetic core material and a hard magnetic core material included in each of said two or more outer layers and said one

or more inner layers.

- [c17] 17. An inductor according to claim 16, wherein said control winding is disposed around a core including said soft magnetic material and said hard magnetic material.
- [c18] 18. An inductor according to claim 16, wherein said soft magnetic core material and said hard magnetic core material are substantially iron oxide-based.
- [c19] 19. An inductor according to claim 16, wherein said control winding is disposed around a core including only said soft magnetic material.
- [c20] 20. An inductor according to claim 16, wherein said hard magnetic core material is adapted to create magnetic biasing within the inductor.
- [c21] 21. An inductor according to claim 16, wherein said inductor metal winding turns is disposed around a core including said soft magnetic material.
- [c22] 22. An inductor according to claim 16, wherein said control winding is adapted to receive an electrical current.